

**AMENDMENTS TO THE CLAIMS**

The following listing of claims replaces all prior listings of claims presented in the application:

1 (Currently amended). A process for synthesis of ultrafine rutile phase titanium dioxide particles through vapor phase hydrolysis of titanium tetrachloride comprising the steps of:

- (a) hydrolyzing a mixture of  $\text{TiCl}_4$  and  $\text{H}_2\text{O}$  and a dopant in vapour phase in an aerosol reactor;
- (b) collecting amorphous or anatase titanium dioxide powder formed as dry powders;  
and
- (c) calcining the dry powder to obtain rutile phase titanium dioxide,  
wherein the amorphous particles of titanium dioxide are calcined at a temperature in the range of 150 to 400°C and for a period in the range of 1 to 4 hrs to generate rutile particles.

2 (Canceled).

3 (Original). A process as claimed in claim 1 wherein the dopant contains a carbon atom and is selected from the group consisting of an aliphatic alcohol, an aromatic hydrocarbon, and any mixture thereof.

4 (Original). A process as claimed in claim 3 wherein the dopant is ethanol.

5 (Original). A process as claimed in claim 1 wherein the molar concentration of the dopant is 1 to 10 based on the water vapour.

6 (Original). A process as claimed in claim 1 wherein the reaction mixture contains from 1 to 10% ethanol on a molar basis based on  $\text{TiCl}_4$ .

7 (Original). A process as claimed in claim 1 wherein the flow rate of  $\text{TiCl}_4$  is in the range of  $10 \text{ cm}^3/\text{min}$  to  $200 \text{ cm}^3/\text{min}$ .

8 (Original). A process as claimed in claim 1 wherein the  $\text{TiCl}_4$  vapor concentration inside the reactor is in the range of  $7 \times 10^{-4} \text{ mol/min}$  to  $1 \times 10^{-2} \text{ mol/min}$ .

9 (Original). A process as claimed in claim 1 wherein the flow rate of water vapour is in the range of  $240$  to  $1500 \text{ cm}^3/\text{min}$ , preferably from  $500$  to  $1000 \text{ cm}^3/\text{min}$ .

10 (Currently amended). A process as claimed in claim 1 wherein the temperature at the exit of the aerosol reactor is maintained at less than  $100^\circ\text{C}$  ~~for obtaining titanium dioxide particles having anatase phase.~~

11 (Original). A process as claimed in claim 1 wherein the aerosol reactor is externally heated in order to avoid particle coating on the walls through thermophoresis.

12 (Original). A process as claimed in claim 1 wherein the aerosol reactor comprises of 3-tube concentric jet assembly wherein  $\text{TiCl}_4$  is introduced into the innermost tube, dopant is introduced into the outermost tube and water vapor is introduced into the middle tube.

13 (Original). A process as claimed in claim 12 wherein the 3-tube assembly comprises a concentric arrangement of three inconel tubes at the entrance of the aerosol reactor.

14 (Original). A process as claimed in claim 12 wherein vapor phase  $\text{TiCl}_4$  is introduced into a center tube of the three concentric inconel tubes.

15 (Original). A process as claimed in claim 1 wherein the vapor phase  $\text{TiCl}_4$  is formed by bubbling an inert gas through  $\text{TiCl}_4$  liquid.

16 (Original). A process as claimed in claim 1 wherein the inert gas is selected from the group consisting of argon, nitrogen, krypton, helium and any mixture thereof.

17 (Original). A process as claimed in claim 1 wherein the molar ratio of water to titanium tetra chloride in the feed is in the range 10 to 15.

18 (Original). A process as claimed in claim 1 wherein the water vapor is formed by bubbling air or inert gases through water under superheated condition.

19 (Original). A process as claimed in claim 1 wherein the reactor wall temperature is from 200 to 450°C.

20 (Original). A process as claimed in claim 1 wherein the rutile titanium dioxide particles formed have an average diameter in the range of from 25 to 150 nanometers.

21 (Currently amended). A vapor phase process for the synthesis of ultrafine rutile titanium dioxide powders carried out in an aerosol reactor comprising the steps of:

- (a) vaporizing a titanium chloride liquid, water and dopant such as ethanol separately for generating a reactant mixture;
- (b) hydrolyzing  $\text{TiCl}_4$ ,  $\text{H}_2\text{O}$  and dopant in vapour phase mixture in a continuous aerosol reactor under non-isothermal conditions at a temperature in the range of 80 to 137°C 135°C;
- (c) collecting amorphous and anatase phase titanium dioxide powder as dry powder;
- (d) calcining the titanium dioxide particles having the amorphous phase in the temperature range of 150-400°C and time duration in the range of 1 to 4 hrs. to obtain titanium dioxide particles with rutile phase.